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# Liquid asphalt, molten glass: studying fluid dynamics at the Nečas Centre for Mathematic Modelling

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Mathematic models help us to understand the flow of blood through capillaries, behaviour of molten glass, flow patterns of asphalt and the movement of icebergs or the Earth's crust. New theoretical questions associated with fluid dynamics and the deformation of various materials constantly crop up in practise, and the most interesting of these are addressed by the internationally recognised Nečas Centre for Mathematic Modelling.

The ceremonial opening of the Centre was held on Thursday 2 May on the premises of the Baroque refectory at Malostranské náměstí in Prague with the participation of Charles University Rector, Professor Václav Hampel and the Chairman of the Czech Academy of Sciences, Professor Jiří Drahoš, as well as leading mathematicians from abroad.

"It is said that the Academy of Sciences and Czech universities do not always see eye-to-eye," noted the Dean of the CU Faculty of Mathematics and Physics (MFF UK), Professor Jan Kratochvíl, adding that "the fact that we are now launching a shared centre is proof that we are able to find common ground where real science, research and the education of the younger generation are concerned. I would like to wish the Centre a productive future."

In the words of Prof. Kratochvíl, the Centre has all the pre-requisites for further expansion of its collaboration with real-world organisations. This does not mean that scientists will focus on how to do things more quickly or cheaply, but primarily on major theoretical questions, in cooperation with other departments. The research group connects scientists from the spheres of theoretical and applied mathematics, computing science, continuum mechanics and material sciences from three institutions: the Institute of Mathematics of the Czech Academy of Sciences (AV ČR), the Institute of Computing Science of the AV ČR and the MFF UK. Apart from creating a shared platform, the Centre represents a unique form of support for research and the education of master's and doctoral students.

The Nečas Centre is intended to become the Czech Republic's representative in European-level cooperation between mathematicians as part of the EU Mathematics in Industry project, which is currently in preparation. The Chairwoman of the Commission for Applied Mathematics of the European Mathematical Society and president of the French Society for Applied and Industrial mathematics (SMAI), Professor Maria J. Esteban (Université Paris-Dauphine) has already held discussions on this topic with Centre representatives and wishes the Centre members success in their planned collaboration with other national groups and areas of application.

Amongst the congratulators from abroad was the founder of the Interdisciplinary Centre for Scientific Computing (IWR) at the University of Heidelberg, Professor Willi Jäger. It is with the University of Heidelberg that the Centre is preparing a project aimed at the international education of postgraduate students, who will have supervisors at both their home and our partner university. The ceremonial opening was also attended by a representative of the largest mathematics centre in the Federal Republic of Germany, Professor Jörg Liesen from the Berlin Technical University.

The gala afternoon was concluded by a congratulatory speech by Professor Jaroslav Nešetřil, Director of the MFF UK Institute for Information Technology (ITI) and DIMATIA centre. The subsequent break was followed by a talk by a talk entitled 'Finite element algorithms for Kolmogorov equations: stability, adaptivity, tractability' by Professor Endré Süli of Oxford University, who has been a guest professor at CU since December 2012.

## The Nečas Centre for Mathematic Modelling

is a continuation of the successful research projects of the basic research centre, which built a solid position within the global academic community during its active period between 2006-11.

Discussions on the re-establishment of the Centre started several years ago. A major contribution to the formation of the Centre was made not only by Dean Jan Kratochvíl, but also the current Vice-Dean for mathematics, Professor Mirko Rokyta.

The Director of the newly established Centre is Professor Josef Málek of the MFF UK. The research team is also organised by the Centre committee of Vít Dolejší, Eduard Feireisl, Zdeněk Strakoš, Luboš Pick and Miroslav Rozložník, as well as a committee consisting of Jan Kratochvíl, Dean of the Faculty of Mathematics and Physics and the Directors of the Institute of Mathematics and Institute of Computing Science of the Czech Academy of Science, Pavel Krejčí and Michal Chytil, respectively.

Professor Jindřich Nečas, after whom the Centre is named, worked in the fields of partial differential equations, non-linear functional analyses and their application in fluid mechanics.